



## Vitamin Supplements... Is There A Difference?

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If you are thinking of starting a vitamin program, you must first educate yourself about all the choices on the market today. All supplements are not the same. Most of the nutritional supplements on the market, whether purchased in a pharmacy, health food store, through a physician's office, or via a multilevel marketing company do not provide much, if any nutrition at all. Few companies produce true food supplements. The concept of a vitamin supplement is to replace nutrition that is lacking in today's lifestyles.

#### 01 | Natural Complexes

Vitamins, as found in nature, are groups of chemically related compounds. There is a part of this complex that science identifies as the organic nutrient. In the case of vitamin C, this organic nutrient is ascorbic acid. In vitamin E complex, the **organic nutrients** are tocopherols. These are the parts that empirical science feels are the workhorses and thus the essence of the vitamin. Therefore, science concludes, if these can be reproduced and supplied to the patient, all that is needed has been provided. Linus Pauling, after all, throughout his writings, basically states that there is no difference between natural and synthetic vitamin C.

The problem is that this thinking does not take into consideration all of the enzymes, precursors, co-enzymes, antioxidants, trace elements, activators and numerous other naturally occurring synergistic micronutrients that are attached to the organic nutrient while in its natural form. Without these naturally occurring micronutrients, the organic nutrient is rendered unusable by the body. In fact, some scientists feel that the organic nutrient mainly acts to protect all of the cofactors allowing them to arrive intact at the cellular level. As one researcher put it, to take the organic nutrient alone is equivalent to consuming a banana peel without the banana and thinking one has consumed nutrition. Whether or not this latter view of the role the organic nutrients play is entirely accurate, the principle of wholeness stands: leave out part of the watch, and you can't keep time.

#### 02 | There is a Difference!

As of 1996, some 3,800 compounds have been identified in foods as being of nutritional significance. For example, to date, approximately 200 forms of carotene have been cataloged, yet beta-carotene is all the rage and is the only one that is placed in vitamin products. How about tocopherols? There are at least five forms of this compound as found in nature. How many vitamin products are you familiar with that contain all five? In addition, research is showing that for each of the tocopherols, there is a counter-part compound known as tocotryanol. How many vitamin supplements that you currently recommend contain these?

Twenty nutrients are about all that modern science can reproduce in a laboratory and place in a vitamin product. The problem is that when the body is lacking in nutrition, it's not lacking in one isolated nutrient. We may have, via clinical evaluation, determined that the symptoms presented are the result of a vitamin C deficiency, but how many co-factors, precursors and naturally associated synergistic micronutrient factors are also lacking that the recommended vitamin supplement does not supply. If we use a little logic, we would have to conclude that whatever we did to create the vitamin C deficiency, at the same time, is creating a deficiency of the many vitamin C co-factors. These co-factors cannot be reproduced in a laboratory; and in my opinion, never will be. How in the world then, can we ever

expect to see the body return itself to a state of health if it is not given the full complement of the nutrients it was designed to run on?

Dr. Forrest Shaklee, Weston Price, D.D.S., Francis Pottenger, D.D.S., Dr. Roger Williams, Dr. Agnes Fay Morgan, Royal Lee, and other nutritional pioneers, understood the concept of whole food complexes some sixty plus years ago. They understood that in order to help the body heal itself, the diet needed to be supplemented with that in which it was lacking or deficient, i.e., **food**. Thus the term food supplement was coined. Sickness is **not** due to isolated nutrients, or organic nutrient deficiencies. Certainly, some nutrients or factors may play a more important role in the picture of health than others, but as stated above, which part of the clock movement does the clock not need to function properly – to keep perfect time? Our goal for ourselves should be to attain the optimum level of health possible, not just temporarily making us feel better. The motivation behind taking vitamins should be health, not just the lack of symptoms.

### 03 | Classifications of Vitamins

There are three classifications of vitamins, one is a whole food supplement, one is a fractionated vitamin, also called a crystalline vitamin and last is a synthetic vitamin. Let's look at each of these individually.

#### 1. Whole Food Supplement

This would be, as its name implies, a supplement of food taken directly from a food source. The word natural truly applies here, for these are vitamins, compounds, co- and synergistic micronutrients taken from a raw food. Nothing is added or extracted that would destroy or change their molecular, biological or biochemical combinations or actions. Basically all that is removed from the food is moisture and fiber. They are processed at a temperature below 112 F in order to leave the enzymes active. A substance that is enzymatically active is capable of fermenting, souring, rotting, developing a bad odor, molding, attracting weevils and other insects. Because of this perishing capability of natural supplements, they must be preserved, which is done by dehydrating and/or freeze-drying. Even so, they have a limited shelf life.

#### 2. Fractionated Vitamins (Crystalline)

While this type of product has a food as its original source (and therefore is not a synthetic vitamin), it has been distilled, diluted and crystallized to the degree that virtually all of the synergistic co-factors present in the original food are processed out or eliminated, leaving only the pure organic nutrient. The motivation for producing this version of a vitamin product is to concentrate the organic nutrient, thus increasing the milligram levels for marketing value. The fractionated vitamins (organic nutrients) are distilled out by a process whereby the source-foods are exposed to high powered chemicals, solvents, heat and distillations reducing it down to the desired individual crystalline vitamin or amino acid. As explained above, while these remaining fractionated compounds are the heart of the vitamin, they are only a value to the body if all of the associated synergistic micronutrients are intact, which make it bioavailable to the cells of the body. Unfortunately, most, if not all of these co-factors are removed. This type of product could also be referred to as crystalline supplements in that they are but a portion or of the complete and original complex from which they were derived. These vitamin products are often labeled natural. According to the FDA, this labeling is not fraudulent in that the original source of the vitamin was food. There are possibly two minor, redeeming aspects of fractionated vitamin products. One, it is virtually impossible to reduce a food to an absolute, pure isolated compound. As a result, some "impurities" will survive the process, which are small amounts of the synergistic co-factors. Two, the organic nutrient retains its natural spin. However, though these factors may be true, we must ask the question, to a greatly deficient body, of what consequence are they?

In summary, according to the writings of Dr. Royal Lee, naturally occurring vitamins differ from synthetic and fractionated vitamins in the following ways:

- Natural compounds are colloidal, protein in nature, in the form of an enzyme or co-enzyme. This means it is a product of food, not a chemical such as plastic or tar.
- The whole food vitamin itself, in its natural state, is in a critical combination and cannot be split off without destroying its biological activity; if separated it must recombine with the other members of the complex before it can function as a nutrient.
- The natural complex carries trace mineral activators without which the vitamin fails as a biochemical catalyst.
- If synthetic or fractionated vitamins are ingested, the missing co-factors must be recombined to a complete complex, before the vitamin function can be performed; meanwhile, most (if not all) of the fractionated component is lost through the kidneys

One very key factor to keep in mind when it comes to vitamin supplementation is that the nutrients that are being supplemented must be useable to the body. This is known as bioavailability, or available to and usable by the cells. In other words, if the co-factors that nature intended to be part of the fractionated vitamin/organic nutrient are not present or the vitamin is in the wrong configuration (spin) when ingested, then the vitamin is not usable to the body. Consuming these types of products is the same as handing someone a steering wheel of a car and telling them they are now the proud owner of a car able to transport them to where ever they want to go.

### 3. Synthetic Vitamins (not a food supplement)

The word synthetic states the nature of this form of vitamin supplement. In a laboratory the organic nutrient (sometimes called the crystalline vitamin molecule) is constructed or synthesized primarily from corn sugar and non-food compounds such as coal tar. While the exact molecular formula of the organic nutrient is replicated, there are at least two problems with this type of product.

A. These synthetic products contain absolutely none of the co-factors that are so vital for the body to be able to use the vitamin. Remember, it is bioavailability or ability of the body to put the vitamin into physiology that counts. Without the synergistic micronutrients present, these synthetic vitamins are of no value to the body. One might argue that surely the body could, from its own reserves, contribute these co-factors and thus be able to use the vitamin. The body is already deficient – where would it find these synergists? But, even if it could, there is a second concern.

B. When vitamins are synthesized under laboratory conditions, the molecular formula may be the same as the organic nutrient found in nature (minus the co-factors), but there is a problem with the spin. The synthetic versions are mirror images of their natural counterpart. For some reason, in the lab, the proper rotation cannot be mastered. The natural version molecules are dextro-rotatory (right hand spin), while the synthetic are levo-rotatory (left hand spin). Thus the attachment sites for the synergistic micronutrients are not available. Gilbert Levin, Ph.D., states the following on this subject: "Because its structure is reversed, a left-handed molecule cannot take part in chemical reactions meant for a right-handed molecule any more than a left hand can fit in a right-handed glove, its odd geometry would prevent it from being metabolized by the body."

## 04 | How Synthetic Vitamins "Work"?

Via anecdotal evidence, all variety of supplements and health products are "curing" everything from hang nails to cancer. How can this be if, from our discussion above, the products consumed are not nutritionally satisfactory, but rather are chemical substances that are either toxic, or lacking the majority of the complete compliment of co-factors that the body so desperately needs for its road back to health?

There are two possibilities why one will feel better when taking a "health product" when in fact it is a long shot from bringing to the body a true supplement of food. The two mechanisms are as follows.

- **Provides some semblance of nutrition.**

This would apply primarily to the fractionated (crystalline) form of vitamin supplements, in that these contain some residual, minute quantities of the co-factors and have the dextro-spin. The mechanism would thus be as follows.

If you are dying of thirst and hunger in the desert and I hand you one cup of water, for a while you will feel like you've been revived. I can continue to hand you all the water you want, and for a time you will continue to improve from your state of desperation. But how long will you continue to improve if all I give you is water when in fact the sum total of the reason you were lacking health was not due totally to dehydration? Your body is also lacking in nutrients – food. Sooner or later, if you are to be totally restored, you will need food. If this is not provided, your health will again begin to slip. You may, at this time reach for a second offering by another passerby – a cola drink. Due to the glucose content, you will again feel somewhat revived relative to how low you felt, because an additional nutrient – glucose – is being supplied. Now you are singing the praises of cola drinks, but your enthusiasm for this too will soon fade since your overall nutrition needs are not being met.

In keeping with the above analogy, many products on the market are composed of some nutrients – fractionated as they may be, but nonetheless, containing some semblance of nutrition. If the body is nutritionally bankrupt and is handed this poor excuse for nutrition – a vitamin product – out of desperation, the body will, if at all possible, capitalize on this and do what healing is possible with the materials given. As low as it may be in nutrition, this product is probably more nutrition than the body has seen in years. Thus initially, for a few weeks, perhaps even months, relative to how the person felt, they will demonstrate some real and actual improvement in their health picture. Given time, their health problems begin to return.

I often ask vitamin pushers if they felt better when they first began taking their product. The common response is an emphatic affirmative. I then inquire if they have been able to reduce the amount of supplementation they started with and still continue to experience the same level of well being. Logic would dictate that if the deficiencies were truly being eliminated, the patient should be able to take less of the product and maintain their health. The usual answer at this point is that they have had to continually increase the dosage, and further, add other products only to find the same frustrating lack of health.

In all fairness, most health product companies do not stress the need for their product consumer to adapt to healthful lifestyle while using the products. The point being, it doesn't matter how wonderful a food supplement may be, even one that actually contains the full complement of nutrition, its nutritional debt repaying ability is dependent on the patient's adaptation to a healthful lifestyle- the reduction/elimination of negative input and the introduction of positive input – primarily revolving around their diet, exercise, rest and stress reduction.

- **Causes a stimulatory reaction in the body.**

Let's say we have a body with debt of several thousand milligrams of vitamin C. Remember this is a debt of vitamin C complex, not just ascorbic acid. The amount of whole and complete vitamin C in an average orange can range up to 50 mg. The most oranges an average person could consume in one sitting are two to three. This represents 100-150 mg of the vitamin C complex. Due to mechanical limitations of the digestive system, we can conclude that a human cannot consume enough oranges in a day to accomplish the task of paying back the debt in one day.

The obvious answer would be to supplement. But we're going to run into a problem in we extract and put into a tablet the vitamin C complex from 20 oranges to manufacture a 1000 mg vitamin C

supplement. One biochemist said that if we were to make a tablet containing a 1000 mg of vitamin C complex, it would be the size of a softball! But more than that, the thing to keep in mind is that this whole complex vitamin C supplement wouldn't simply be 1000 mg of ascorbic acid. It would be the whole complement of nutrients that would be so rich the body simply could not process it. At the very least, it would produce diarrhea as the body attempted to eliminate this needed, but non-processable supplement. We can conclude this by the very fact that nature does not have a food that contains high doses of isolated complexes; further, we are mechanically restricted from consuming enough foods to obtain such high doses in the course of a day. All the fiber, fluid and other nutrients in the foods serve to keep us from consuming more than the body can assimilate, thus none is wasted, neither is there any stress on the body from having to deal with excess concentration of individual nutrients.

Motivated by producing supplements at low costs and pandering to the average consumer's philosophy that "if a little is good then a lot is better," vitamin manufacturers figured out how to synthesize isolated nutrients in high concentrations to get the debt paid back in a hurry. Thus the birth of the crystalline and/or synthetic vitamins. The problem is, the crystalline form is too high in concentrations of isolated substances. These substances are either not recognizable by the body or if recognizable are certainly way out of balance for the body's internal chemistry. In the face of this threat, the body must enact some extra-ordinary measures in order to maintain homeostasis either in making this substance into something usable or eliminating it. This would be a similar process the body goes into when caffeine is consumed, which is a mini fight or flight reaction.

Under the influence of this process, a feeling of euphoria is obtained due to excess adrenal function. Adrenaline is an analgesic, anti-inflammatory and anti-histamine. All of the body's systems are enhanced, including the immune system. The consumer misinterprets this feeling as that of health or healing. I always tell my patients who insist that their synthetic vitamins are making them feel better, that they should rather drink coffee and save their money. Thus initially, a sick and worn down body will feel revived. Of course this same effect can be created by drinking a strong cup of coffee. But how long will the feeling of well being continue? A coffee drinker knows that each year or two he must increase how much coffee he drinks a day, or add some other stimulant (extra salt, nicotine, etc) to accomplish the same stimulatory response to obtain a similar level of energy as in previous years.

Often I hear the argument that high concentrations of nutrients taken as a supplement are not harmful because the kidneys just eliminate what the body cannot use. What is being overlooked with that line of reasoning is that these compounds don't just pass through, they must be actively transported out of the body. For example, in the instance of high doses of ascorbic acid, diarrhea results - an energy consuming process. Whether the synthetic compound is eliminated via the kidney, bowel or other possible avenues, this process costs our body nutrition and energy that would be more valuable if it were available for health and healing. Not to mention that the synthetic contributed little, if anything, to the well being of the body. The saying goes, "you don't buy synthetic vitamins, you rent them."

## **05 | Labeling Ploys**

The label of both the crystalline and the synthetic vitamins will list only the chemical name of the single vitamin. Legally, the manufacturers are not required to list the source form which the product is derived. The following is an example of how a fractionated or synthetic vitamin label would read as compared to how a whole food vitamin is labeled.

<b>Vitamin</b>	<b>Fractionated/Synthetic</b>	<b>Wholefood</b>
Vitamin A	Acetate, Retinal Palmitate, Beta Carotene	Carrots, Barley Leaf
Vitamin B1	Thiamine HCl, Thiamine Mononitrate (coal tar derivatives)	Kelp, Spirulina
Vitamin B3	Niacin	Spirulina, Chlorella
Vitamin B6	Pyridoxine	Wheatgrass, Algae
Vitamin B12	Cyanocobalamin	Kamut, Chlorella
Vitamin C	Ascorbic Acid, Pycnogenols (from corn sugar/syrup)	Amla, Broccoli, Green Pepper
Vitamin E	d-Alpha Tocopherol, dl-Alpha Tocopherol, d-Alpha Succinate (from processed food oils – cottonseed, soybean)	Wheatgrass, Spinach, Wheat Germ
Vitamin K	K3 or Menadione	Kamut, Chlorella
Folate	Folic Acid	Spirulina, Blue Green Algae

An allowable marketing practice is to attach the word Natural or Organic on the label of these fractionated and laboratory synthesized substances implying that they are in fact food-source products. These manufacturers can legally do this because the FDA considers the word natural as anything that comes from nature – including chemicals – since they ultimately come from nature. The word Organic is interpreted as anything that contains a carbon molecule (not an organically grown or chemically free product).

On the other hand, food supplement manufacturers which produce their products from a food source, will generally list on the label the actual foods from which the vitamin in their product came.

A somewhat deceptive labeling ploy often used is that the word pure is used for the synthetic vitamins. This too is legal because they are the pure essence of the organic nutrient. The phrase vitamin complex often appears on the label of fractionated crystalline vitamin products. This is allowable because these are derived from food sources, and usually contain minute quantities of the co-factors which were in the source food (as explained earlier in this paper).

Another misleading, yet legal practice is to print on the label "Vitamin C from Natural Sources". The natural source they are referring to is corn sugar. The label may further contain the following: "... with bioflavonoids and rutin". While these words sound good, they are usually synthesized versions of some co-factors found in the natural vitamin complex. Adding these gives the manufacturer the legal right to print on the label, "Vitamin C Complex".

In general, the label is not the most reliable place to look to determine if the vitamins contained inside are of a food source or of synthetic origin. Most of the time, if a manufacturing company understands the benefit of food-source supplements, they are proud of it and know that it will market well to the informed consumer, thus, as stated above, the food sources will be listed. If the label is not clear as to the source of the vitamins being purchased, the only sure-fire way to determine this, is to contact the manufacturing company and ask the following question: What is the food source of the nutrients in your product? If the response is anything other than a list of foods, you will know it is synthetic. If they supply a list of foods, remember that the crystalline form, while greatly fractionated, originates from food. So a follow up question should be asked, What was the method of extracting the vitamins from the food? Asking, "Are your vitamins natural?" is not a good question, because they will always answer, "yes," and legally can, even if it is the synthetic version (as per above). I get suspicious when my questions are

responded to with something like, "What you're asking is proprietary." All they have to divulge is a list of foods; why are they hesitant?

It's not a very scientific test, but observing the color of the urine is one method of determining if the supplements consumed are synthetic or food source. When a synthetic product is consumed, the urine will usually turn bright yellow, and often takes on a chemical odor. This is because these synthetic compounds are being washed out, unused.

#### **06 | Potency is Not Determined by Milligram Levels**

Food source supplements don't market well because the posted milligram levels of the key nutrients (RDA's) listed on the label are low (relative to synthetic vitamin labels) and they are more expensive to produce, thus the retail price is higher. Synthetic vitamins on the other hand, are more popular because the milligram levels are so high, the price is low and they have an almost indefinite shelf life – which the retailer likes. It is easy to see how the uninformed consumer would compare labels and prices of a food source product with a synthetic, and reason, "I can get 10 times the concentration of nutrients at a third of the cost if I buy the synthetic version," not realizing that he is not paying for nutrition, but some stimulatory chemicals.

The problem is that the consumer thinks that the organic nutrient is the sum total of the active ingredient of the vitamin, and since a little is good, a lot must be better. Plus the higher the dosage, the faster the debt will be paid back and thus the return to health. As has been illustrated above, what is required to pay back debts for the purpose of returning to health is that the sum total of the nutritional picture that is missing, be supplied to the body, not a fraction thereof. Potency is not necessarily how high the milligram level, rather, how effectively the nutrients are paid back. Potency is determined by bioavailability, which is the providing of and the delivering to the cells of, all the missing nutritional factors with as little cost to the cell as possible.

As stated above, the delivery of a partial nutritional substance (fractionated vitamin) may be helpful, but how many missing co-factors must the body provide (assuming it can), how much work does the body have to expend, to appropriate these fractions into physiology (does the body have to modify them in order to use them), and does the body have to pay to eliminate any excesses of the synthetic and/or fractionated nutrients? If any of these are true, the vitamin supplement may actually cost the body more value than it receives from the supplement. It is quality, not the quantity that counts.

Most whole food supplements don't label the milligram amounts of an individual vitamin due to the fact that a true food supplement contains thousands of vitamins and co-factors. The actual amount of a particular vitamin can vary from batch to batch due to the nutrient density of the foods utilized at the time of packaging. One crop of carrots can differ from another due to environmental conditions and farming practices. Remember, it takes a much lower milligram dose of a whole food vitamin than it does of a fractionated or synthetic to correct a nutritional deficiency.